

fovea punctiform; ocellar basin broadly limited by a distinct frontal crest, surrounding the median ocellus; antennal furrows obscure, interrupted near middle of their length; vertical furrows deep, broad, longer than broad; postocellar area with a deep mesal furrow connecting with shallow inconspicuous ocellar furrow; surface of head dull; mesonotum dull, indefinitely punctate or striate; mesoseutellum with distinct furrows on each side, polished on meson; metascutellum polished, impunctate; mesopleura dull, sparsely sericeous; cerci distinct, short, porrect; caudal margin of caudal sternum rounded; wings hyaline, costa reddish, veins and stigma infuscated. Length 8 mm.

Habitat: Ithaca, New York. No. 20-1.

The general appearance of this species, the arrangement of the pale color and the line of the abdominal segments is similar to that of *Strongylogaster politus* Prov. The difference in the coloration of the abdomen will differentiate it from *Thrinax impressatus* Prov.

NEW UNITED STATES ZOOECIDIA.

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In the descriptions below, the author has indicated in each case whether the gall is a kataplasma or a prosoplasma. These terms of Küster's pertaining to the lower and higher galls respectively, deserve a prominent place in gall descriptions, for they connote very significant conditions. The writer has pointed out (Botanical Gazette, May, 1921) that these groups have an evolutionary relationship. By "kataplasma" Küster means those indefinite galls whose structure is developed through hyperplasia of embryonic tissue, the end product not becoming in its differentiation, orientation and form of tissues, fundamentally different from the normal plant part; they represent inhibitions of the normal differentiations, the more advanced ones thus approach homogeneity. "Prosoplasmas," on the other hand, are definite galls whose structure differs fundamentally from the normal plant part, the tissues

in their form and orientation characters constituting an aggregation of new qualities.

In presenting these descriptions, it is with the hope that these forms may again be collected and the adult stages of the cecidozoons be obtained.

Not until the descriptions of the adults appear should names be attached to galls; in the present paper the forms have been given a number which can readily be referred to by any future investigator. I should like to here repeat a statement made in an earlier paper: "The custom on the part of some, of applying a specific name to an insect or mite, merely on the basis of the intimately associated gall, is to be deplored."

The familiar "catch-all" generic names have been used in those cases in which the nature of the parasitic organism was determined, viz., "Cecidomyia" for an itonidid form, "Cynips" for a cynipidous form, and "Eriophyes" for a mite gall-maker.

The galls herein described and believed to be heretofore unreported, are arranged on the basis of the plant affected. The plant genera are arranged alphabetically, Gray's Manual being followed in the matter of nomenclature.

* *Amelanchier*

Cecidomyia sp. *Cecidium* nov. Fig. 1.

1. On *Amelanchier canadensis* (L) Medic., leaf; prosoplasma, appendicular, diverticulum type; stout balloon-shape with attenuate tip, 3-5 mm. long, 2-3 mm. wide, reddish purple, surface, however, with bloom which gives it a bluish tinge; galls commonly found in groups of two, on under side of leaf, each gall tilted out of the perpendicular position; opening in leaf-blade on side opposite the gall, minute, slit-like with definitely raised lips; cavity small in the broader, distal part connected with opening by a relatively narrow canal, walls thick with rather prominent veins; not common, Cedar Point, O. Types in author's collection.

Cecidomyia sp. *Cecidium* nov. Fig. 2.

2. On intervenal areas of leaf of *Amelanchier canadensis* (L) Medic. (service berry); prosoplasma, sub-ovoid, laterally flattened, the sides paralleling the secondary veins, extending from both sides of the leaf, long axis perpendicular to the blade, 2-3 mm. long,

upper side rounded, yellow or red, lower side truncate with slit-like opening, yellowish, surface smooth; monothalamous, chamber in upper half of gall connected with slit-like opening by narrow, flattened canal, walls firm; locally abundant, Hocking Co., Ohio, Cedar Point, Ohio. Types in collection of author.

Amorpha.

Cecidomyia sp. Cecidium nov. Fig. 3.

3. On *Amorpha canescens* Pursh, leaf rachis, leaflet either side or flower stalks; prosoplasma, up-walled type; cone-shaped with truncate ends, more or less curved, when on leaflet, base projects as a rounded prominence beyond the blade, 4-12 mm. long, larger when on leaf or floral axes, galls of leaflets exposed to light distinctly red in color, pubescence similar to that of normal plant; chamber shape conforms to that of gall; fairly common, numerous on particular plants, Manhattan, Kan. Types in collection of writer.

Cecidomyia sp. Cecidium nov. Fig. 4.

4. On *Amorpha canescens* Pursh, leaflet; kataplasma, edge-roll type; revolute leaf edge, yellow, 3-5 mm. long, pubescent like normal leaf; fairly common, Manhattan, Kan. Types in collection of writer.

Albizzia.

Coccid sp. Cecidium nov. Fig. 5.

5. On *Albizzia julibrissin* Durazzini, stem surface; kataplasma; simple, circular elevations with depression in center containing coccid, 5.8 mm. dia., lighter in color than surrounding bark, the color of the new hyperplastic tissue which has become exposed; locally common, Raleigh, N. C. Types in collection of the writer.

The above gall may be found on stems of widely varying age. It may be formed on trunks measuring 7-8 cm. dia. The figure is from a stem measuring 3 cm. in dia. and which is 7 years old.

Azalea.

Coccid sp. Cecidium nov. Fig. 6.

6. On *Azalea nudiflora* (L) Torr., stem surface; kataplasma; simple diamond-shaped elevations with rounded corners with depression in center containing coccid, 1 cm. long, elevation about

2 mm. above twig surface. Surface of raised portion coarsely striate due to splitting of original epidermis; abundant locally. Raleigh, N. C. Types in collection of the writer.

Castanea.

Cecidomyia sp. Cecidium nov. Fig. 7.

7. On *Castanea pumila* (L) Mill., leaf; prosoplasma, asymmetric up-walled type; arises from vein (under side) and curls in toward leaf forming pocket, blade above gall pressed upward forming umbo as seen from above, gall flattened parallel to blade. 4 mm. long, 2 mm. wide, surface same as leaf or lighter; chamber ovoid, wall thick especially on vein side; abundant on certain trees, Carolina Beach, N. C. Types in collection of writer.

This gall is of especial interest for the reason that it is a striking asymmetric variant of the up-walled type. It appears to be produced by an upgrowth from the vein which instead of being equal on all sides of the larva is distinctly one-sided, resulting in the strongly curled or revolute structure observed. I know of no other gall like it in this respect; it constitutes a new fundamental gall type.

A relatively large itonidid larva was constantly present in the galls.

Chenopodium.

Cecidozoon undetermined. Cecidium nov. Fig. 8.

8. On *Chenopodium ambrosioides* var. *anthelminticum* (L) Gray, stem gall; kataplasma; simple fusiform enlargement of the stem, 1-1.5 cm. long, color and texture same as stem, single chamber elongate, relatively large with irregularly pitted walls; not common, Toledo, O. Types in the collection of the writer.

Cunila.

Cecidomyia sp. (?) Cecidium nov. Fig. 9.

9. On *Cunila origanoides* (L) Britt. (Dittany), bud gall, on ends of aborted upper branches; prosoplasma, up-walled type; sub-spherical, tipped with short point, 2-3.5 mm. dia., green at first early becoming bluish-purple, surface glandular same as leaves, sessile on branch end, invested below by an involucre of a few inconspicuous, foliaceous bracts; chamber large, same shape as gall,

wall thin, similar to leaf in texture though slightly thicker than leaf; few on any one plant. Martin Co., Ind. Types in collection of writer.

This gall was collected by Mr. Chas. C. Deam, to whom I am indebted for its study.

Gleditsia.

Cecidomyia sp. Cecidium nov. Fig. 10.

10. On *Gleditsia triacanthos* L., leaf rachis; kataplasma; simple elongate swelling of leaf rachis, commonly the secondary axes, 5-10 mm. long, about 1 mm. dia., surface same as normal rachis; monothalamous, the chamber a mere capillary tube; not uncommon, Toledo, O. Types in collection of writer.

Grindelia.

Cecidomyia sp. Cecidium nov. Fig. 11.

11. On *Grindelia lanceolata* Nutt. (Rosin weed), a modification of the floral head; kataplasma, rosette type; a mass of overlapping involucrel bracts (each external bract much thicker than normal ones), the whole assuming an ovoid shape, 2.4-3.5 cm. long; single chamber at center surrounded by much reduced bracts, elongate-ovoid; one or few galls on single plant, infrequent; Fayetteville, Ark. Types in collection of writer.

The characteristic salmon-covered larva of the Itonididæ with breast-plate was found in the galls.

Fig. 11, left, shows a normal head and a galled one; right, section of affected head.

Grindelia.

Cecidomyia sp. Cecidium nov. Fig. 12.

12. On *Grindelia squarrosa* (Pursh) Dunal, bud gall; kataplasma; sub-globose with attenuate tip or tips representing aborted leaf elements, 5-8 mm. dia., green, very prominent in axils of normal leaves, 1-4 chambers, each elliptical in outline, walls thick of firm, fleshy texture; not common, Manhattan, Kan. Types in the collection of writer.

Hedeoma.

Cecidomyia sp. (?) Cecidium nov. Fig. 13.

13. On *Hedeoma pulegioides* (L) Pers. (Pennyroyal), a simple

inflated calyx; kataplasma, organoid type; calyx slightly inflated to sub-spherical form, 2 mm. dia., segments but slightly differentiated if at all, yellowish, normal nutlets undeveloped. Rather abundant on specimens of pennyroyal seen. Jeffersonville, Ind. 1-4 larvæ present in galls.

Collected by Mr. Chas. C. Deam.

* Fig. 13, upper, normal calyx; lower, affected calyx.

Heterotheca.

Lepidopteron. Cecidium nov. Fig. 14.

14. On *Heterotheca subaxillaris* (Lam.) Britton and Rusby, stem gall; kataplasma; simple fusiform enlargement of stem, 3.5-5 cm. long, about 1 cm. wide, epidermis split into elongate diamond-shaped areas concolorous with stem, chamber relatively large, shape of gall. Not uncommon, Arlington, Texas. Types in collection of writer.

Ilex.

Cecidomyia sp. Cecidium nov. Fig. 15.

15. On *Ilex vomitoria* Ait. leaf; kataplasma, leaf-fold type; a simple fold of leaf along midvein with accompanying thickening of part involved, commonly affecting the terminal leaves in which the largest part of the blade is involved, 3-5 mm. long, 2-3 mm. wide, surface same as normal leaf except color is lighter or where exposed to sun, red tinged; Carolina Beach, N. C. (Fort Fisher) occurring on shrubs exposed to ocean; rather common. Types in collection of writer.

Lepidium.

Cecidozoon undetermined. Cecidium nov. Fig. 16.

16. On *Lepidium virginicum* L., stem or root surface; kataplasma; simple, sub-globular, sessile, at stem base or crown of root. .5-1 mm. dia., yellow, smooth; in each gall a yellow-ovoid egg was found (.2 x .15 mm.) enclosed by the homogenous, pith-like tissues of the gall; Arkansas. Types in collection of writer.

The fact that this gall has developed in the presence of the unhatched egg indicates the stimulus to have originated with the adult cecidozoon at the time of oviposition. I was unable to rear the adults and am unable to assign the gall to any group.

I am indebted to Mr. M. R. Ensign for this material.

Fig. 16, left, galls on stem base; right, included egg.

Liatris.

Cecidomyia sp. Cecidium nov. Fig. 17.

17. On *Liatris punctata* Hook., bud gall; kataplasma; subglobular, consisting of a mass of swollen and fused leaves, the ends of some of them projecting distally from the gall, 5-10 mm. dia., 3-5 elongate larval chambers; not common, Manhattan, Kan. Types in collection of writer.

Lobelia.

Cecidomyia sp. Cecidium nov. Fig. 18.

18. On *Lobelia puberula* Michx., stem swelling; kataplasma; simple rather inconspicuous enlargement of stem, variable in length, the maximum being about 10 cm., width varying from 4-5 mm., surface same as normal stem except for presence of a few longitudinal fissures in the epidermis exposing the cortical layer; internally the pith tissue contains a more or less broken, narrow cavity occupied by the larvae which are distributed in a linear series; all tissues of the stem are about equally involved in the hyperplasia. Not uncommon, Raleigh, N. C. Types in collection of the writer.

I am indebted to Mr. I. V. Shunk for the original collection of this material.

Parthenium.

Eriophyes sp. Cecidium nov. Fig. 19.

19. On *Parthenium integrifolium* L.; leaf-blade gall; kataplasma, diverticulum type with trichomes (erineum); extremely variable evaginations projecting either side of the leaf, the smaller ones covered internally and exteriorly with a heavy layer of tomentum made up of slender, twisted, multicellular trichomes, larger pouches often nearly smooth on exterior. Rather infrequent, West Raleigh, N. C. Types in author's collection.

Fig. 19, left, affected leaf; right, two trichomes.

Persea.

Aphid sp. Cecidium nov. Fig. 20.

20. On *Persea Borbonia* (L) Spreng., leaf; kataplasma, leaf

edge-roll type; rather definite local inrollings (upper side) of leaf edge, wall markedly thicker than ordinary leaf, forming definite cavity, galls variable in size, .4-2 cm. long, 3-10 mm. wide, surface smooth, often glaucous, lighter in color than leaf when young, changing to red and finally black when old; abundant, Wrightsville, N. C. Types in author's collection.

Pinus.

Eriophyes sp. *Cecidium* nov. Fig. 21.

21. On *Pinus echinata* Mill., bud; kataplasma; rosette type; excessive proliferation of stem buds, the leaves either remain massed in the bud condition or develop in a semi-aborted fashion, forming a dense cluster or rosette; intermediate states are of course found; not uncommon, S. E. Ohio, North Carolina. Types in author's collection.

For the first observed material of this form I am indebted to Mr. J. S. Houser of the Ohio Ex. Station. I have repeatedly collected it in North Carolina. In all collections the mites were demonstrated.

Polygonum.

Coleopteron sp. (?) *Cecidium* nov. Fig. 22.

22. On *Polygonum aviculare* L. (Bird's Knot Weed), internodal swelling; ovoid enlargement of internode (sometimes involving two internodes), 8-13 mm. long, 3-7 mm. wide, green to reddish brown, surface more coarsely striate than normal stem; chamber large, same shape as gall, walls firm; few on plant; Mt. Vernon, Ind. Types in collection of writer.

This gall was collected by Mr. Chas. C. Deam of Bluffton, Ind.

Larvæ taken from the galls were tentatively determined as coleopterous by Professor Z. P. Metcalf of N. C. State College. It is to be hoped this insect may soon be successfully reared, for, if it is coleopterous, it will be an interesting addition to the very limited group of gall-making beetles known in America.

Polygonum.

Cecidozoon undetermined. *Cecidium* nov. Fig. 23.

23. On *Polygonum lapathifolium* L., leaf edge-roll gall; kataplasma; variable in size and shape, often involving leaf to midrib,

roll very tight, yellow in color, contrasting strongly with normal part of leaf. Common locally, Raleigh, N. C. Types in collection of writer.

In the central region of these galls there constantly occurred a white larva without breast-plate. Whether or not these were merely secondary forms in a possible aphid gall was not determined.

Quercus.

Cynips sp. (?) *Cecidium* nov. Fig. 24.

24. On *Quercus Muhlenbergii* Engelm., leaf; prosoplasma; broadly crescentic or banana-shaped, attached laterally and sessile on under side of leaf, tips attenuate, 2.5 mm. long, 1 mm. wide, smooth, light green, cavity large ovoid not extending into tips, wall thin; not common, Manhattan, Kan. One specimen, type in collection of writer.

Houard describes a similar gall formed on *Q. toza* of Europe by *Trigonospis bruneicornis* Tav. This form differs, however, in bearing long, straggling hairs.

Cynips sp. *Cecidium* nov. Fig. 25.

25. On *Quercus stellata* Wang., terminal twig swelling; katarprosoplasma; broadly clavate to ovate, 1-2 cm. long, surface similar to normal twig, bud-bearing, monothalamous with false chamber occurring distal to larval cell and opening exteriorly by constricted orifice, false chamber widest near proximal end, lined with thin layer of hard tissue, larval cell ovoid embedded in woody tissue which constitutes the bulk of the gall; not common, Arlington, Tex. Types in the collection of writer.

Amphibolips sp. (?) *Cecidium* nov. Fig. 26.

26. On *Quercus marylandica* Muench. at node (originates from bud meristem); prosoplasma, radiate-fiber type; balloon-shaped, 1.5-2.25 cm., long axis, green at first, turning yellow when old, not spotted, smooth; larval chamber connected to peripheral zone by relatively few coarse fibers, outer zone or wall very thick (2-3 mm.) and of pith-like consistency, not shrinking when old; fairly common, Arlington, Tex. Types in collection of writer.

The above is somewhat similar to *Amphibolips cooki* Gillette. It differs in the absence of the red spots, has a thicker wall, is

never distally nipped and does not shrivel upon drying. The galls remain on the trees for some time after the leaves have fallen and thus are readily observed in the winter.

Cynips sp. *Cecidium* nov. Fig. 27.

27. On *Quercus stellata* Wang., leaf petiole; prosoplasma; clustered, appendicular; single galls broadly fusiform, angular below through mutual compression, distally round-conic, 4-7 mm. long, 3-5 mm. wide, reddish brown, puberulent; larval chamber in fall minute, .25 mm. dia., walls correspondingly thick, firm, fleshy, outer half more deeply colored (tannin bearing) than inner half; not uncommon, Arlington, Tex. Types in collection of writer.

These galls are most commonly found on the petiole bases of the terminal leaves, where they occur in such masses as to give a striking aspect to the branch end. They dehisce from the trees in late fall, the larva completing its development through the winter and spring.

Rhus.

Eriophyes sp. *Cecidium* nov. Fig. 28.

28. On *Rhus canadensis* Marsh, leaf; kata-prosoplasma, diverticulum type; irregularly rounded pocket gall, appendicular, under side, 4-6 mm. dia., green to red, on upper side marked by conic depression filled with trichomes; chamber highly branched, opening into depression, trichomes not abundant within; not uncommon, Manhattan, Kans. Types in writer's collection.

Felt¹ mentions a "cylindric pouch gall" on *R. trilobata* (*canadensis*) from Utah. I have collected this narrow, fusiform type in Kansas. It is sharply and constantly different from the above.

¹ Felt, E. P. Key to Am. Insect Galls. N. Y. State Mus. Bull. 200. 1918.

Solanum.

Cecidozoon undetermined. *Cecidium* nov. Fig. 29.

29. On *Solanum nigrum* (L.) bud gall; kataplasma. gall consists merely of two highly distorted leaves with their incurled edges tightly appressed, forming a large cavity within. The principal veins are not contorted, this condition being confined to the smaller veins and intervenal tissues which have through slight hyperplasia and hypertrophy grown beyond the normal limits of the principal

